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SHAIL, TANMAY K				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptopatentcommunication@lockelord.com

Office Action Summary

Application No.

10/517,937

Applicant(s)

HENRIKSSON, JUKKA

Examiner

TANMAY K. SHAH

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19-24 and 26-41 is/are rejected.
- 7) ☒ Claim(s) 18, 25, 42 and 43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This communication is in response to the Amendment to Application 10/517,937 filed on 8/20/10.

Response to Arguments

2. Applicant's arguments filed on 8/20/10 have been fully considered but they are not persuasive.

3. First, applicant amended claims 1, 29, 38, 40, 41 to include limitation determined using a covariance function which was presented in claim 16 previously. Applicant argues that the added limitation is not taught by the applied reference Maja as the applied reference teaches autocorrelation function. Applicant further argues that the autocorrelation and covariance are not same (Remarks page 12, ¶ 2).

4. Examiner used Maja to reject claim 16 as Maja page 223, col 2, section 3 teaches to detect impulse noise and determine its position, amplitude, power, autocorrelation function (i.e. covariance function) or spectrum of the received signal, or the combination of the above, can be analyzed. Examiner in the previous office actions stated that the term auto-correlation and covariance can be interchangeably used. Examiner now provides a reference to support this statement. Please refer to paragraph 33 of Benitz (US 2003/0071750). Benitz paragraph 33 states that "where $I(r,c)$ is the output image at location range r and cross-range c , ω is a vector of the weighting coefficients (i.e., beam forming or combining coefficients) which are applied to the covariance matrix R (also known as the autocorrelation matrix) of the data, and $v(r,c)$ is the steering vector for a point scatterer at the location (r,c) ". So, the examiner

provided reference to support the above statement that the autocorrelation and covariance term can interchangeably used. So, Maja still teaches the argued limitation.

5. Applicant also argues that the cited reference Maja discloses the detection of signal samples corrupted with impulse noise, not with the determining a carrier correction value as recited in claim 1. Examiner would like to point out that Applicant should submit an argument under the heading "Remarks" pointing out disagreements with the examiner's contentions. Applicant must also discuss the references applied against the claims, explaining how the claims avoid the references or distinguish from them (**please refer to MPEP 714**). Examiner does not find enough arguments supporting applicant's statement. Examiner does not find any discussion on how the applied reference is different from the instant application. Examiner provides statement again that the signal constellation can be considered priori known data, which are used to enhance the system performance or to increase the length of the allowed impulse length, as shown in Fig. 2 (c) the received carrier values are compared with the known constellation and then corrected, As, shown in Fig. 2 and 3 and discussed above it is clear that the estimated is then corrected using the known constellation points in Fig. 3.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 - 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Maja Sliskovic (Signal Processing Algorithm for OFDM Channel With Impulse Noise) (Maja hereafter) in further view of Digital Video Broadcasting (DVB); framing structure, channel coding and modulation for digital terrestrial television" ETSI EN 300 744 V1.1.1, January 2001, Cover and pp. 2 – 49 (ETSI hereafter).

Regarding claim 1, Regarding claim 1, A method for receiving a multi-carrier signal, the method comprising the steps of:

detecting a presence of at least one impulse interference within the signal (i.e. **the receiver detects the presence and the position of the impulse within the OFDM symbol of combining the power calculation in time And frequency domain, samples corrupted by impulse noise are reconstructed by using the redundancy of the guard band in frequency domain, Abstract**),

blanking samples where significant amount of the impulse noise caused by the at least one impulse interference is present to obtain a signal with blanking (i.e. **in the received signal, the position of the impulse is determined by the method presented in the previous chapter, and the corresponding samples are set to zero, setting zero the corrupted is considered blanking, page 224, section 4, equation 10**),

determining an estimate of the signal with blanking (i.e. **the corrupted samples can be estimated. with the estimates P_k and the samples r_{2k} , a signal is formed and the digital information obtained, page 224, section 4, equation 13**),

determining carrier correction values, which carrier correction values are based on deviations of certain carrier values compared to prior known information, and the blanking (i.e. **signal constellation, some other restriction on the signal constellation in complex plane may also be used to enhance the system performance or to increase the length of the allowed impulse length, as shown in Fig. 2 (c) the received carrier values are compared with the known constellation and then corrected, As, shown in Fig. 2 and 3 and discussed above it is clear that the estimated is than corrected using the known constellation points in Fig. 3).**

ETSI teaches influencing the estimate by the carrier correction values to obtain a representation of a desired signal (i.e. **various cells within the OFDM frame are modulated with reference information whose transmitted value is known to receiver. Cells containing reference information are transmitted at "boosted" power level. The information transmitted in these cells are scattered or continual pilot cells, so at the receiver side use of demapping and reference it computes the desired signal, page 26, section 4.5.1).**

It would have been obvious to one of the ordinary skilled in the art at the time the invention was made to combine the teachings of Maja with ETSI. One would be motivated to combine these teachings because in doing so it will provide the desired output more accurately.

Regarding claim 2, Maja with ETSI with teaches claim 1,

Maja further teaches wherein the step of determining the estimate comprises the step of calculating the estimate by a time domain to frequency domain transform of the signal with the blanking and temporarily storing the estimate (**i.e. the algorithm proposed in this paper uses redundancy in the frequency domain to cancel the impulse noise in time domain, also it is inherent to one of the ordinary skilled in the art to have memory to temporary store the blanking estimate, page 222, section 1, col 2).**

Regarding claim 3, Maja with ETSI teaches claim 1. however does not specifically disclose the steps of carrier correction values.

ETSI teaches calculating a difference between observed pilot values and known values for pilot carriers (**i.e. various cells within the OFDM frame are modulated with reference information whose transmitted value is known to receiver. Cells containing reference information are transmitted at "boosted" power level. The information transmitted in these cells are scattered or continual pilot cells, so at the receiver side use of demapping and reference it computes the desired signal, page 26, section 4.5.1),**

calculating weight values (**i.e. normalization factor**) corresponding to blanking window position, and applied pilot based system (**i.e. as shown in table 6, the normalization is done with use of constellation, page 26),**

calculating the carrier correction values based on the difference and the weight values for each carrier (**it does it for each carrier, i.e. the value of the scattered or continual pilot information is derived from a PRBS which is a series values, one for each carrier, page 26**), and

calculating the corrected estimate by computing the carrier correction values with the stored estimate (**i.e. it is inherent to one of ordinary skilled in the art to have memory element for each correction value for each carrier**).

Regarding claim 4, Maja with ETSI teaches, further comprising before the step of determining the estimate, the step of shifting sampled signal in such a way that a blanking window is substantially centred at first sample position, and compensating the phase shift for each carrier before forwarding a corrected estimated signal.

Regarding claim 5, Maja with ETSI teaches method according to claim 1,

Maja further teaches wherein the step of detecting is based on a sliding window calculation (**i.e. sliding window, 'To determine the impulse position within the symbol, the power calculation on sliding window in the time domain will be used, page 224, col 1, section 3**).

Regarding claim 6, Maja with ETSI teaches method according to claim 1,

Maja further teaches A method according claim 1, wherein the step of detecting is based on monitoring an exceeding of a threshold in amplitude of the signal (**i.e. the detect impulse noise and determine its position, amplitude, power, auto-correlation function, so the amplitude is the threshold, page 223, section 3, col 2).**

Regarding claim 7, Maja with ETSI teaches method according to claim 1,

Maja further wherein the step of detecting is based on monitoring amplitude variations (**i.e. the detect impulse noise and determine its position, amplitude, power, auto-correlation function, so the amplitude is the threshold, page 223, section 3, col 2).**

Regarding claim 8, Maja with ETSI teaches claim 1,

Maja further teaches a method according to claim 1, wherein the step of blanking comprises blanking a predetermined amount of digital values substantially coincident with the impulse interference (**i.e. the blanking is the value being replaced with 0 where the impulse noise is detected, so it is coincide with the interference, page 224, section 4).**

Regarding claim 9, Maja with ETSI teaches claim 1,

Maja further teaches step of blanking comprises a predetermined set of blanking window positions (**i.e. as shown in Equation 9, it is preset page 224, section 4**).

Regarding claim 10, Maja with ETSI teaches claim 1,

Maja further teaches wherein the step of blanking comprises blanking digital values which coincide with the impulse interference (**i.e. the blanking is the value being replaced with 0 where the impulse noise is detected, so it is coincide with the interference, page 224, section 4, it is digital since it is converted to digital for processing in communication systems**).

Regarding claim 11, Maja with ETSI teaches claim 1,

Maja further teaches wherein the step of blanking is based on an appliance of position and duration of the impulse interference (**i.e. the blanking is the value being replaced with 0 where the impulse noise is detected, so it is coincide with the interference, page 224, section 4, it is the interference caused by different appliances in household as admitted by the applicant**).

Regarding claim 12, Maja with ETSI teaches claim 1,

Maja further teaches wherein the step of blanking comprises blanking digital values directly affected by the impulse interference and digital value neighbouring the impulse interference (**i.e. the blanking is the value being replaced with 0 where the impulse noise is detected, so it is coincide with the interference, page 224, section 4, it is in neighbouring digital value form different appliances**).

Regarding claim 13, Maja with ETSI teaches claim 1,

Maja further teaches wherein a blanking window comprises at least one of a rectangular blanking window, and a blanking window with smooth transitions at end (**i.e. it is inherent to one of ordinary skilled in the art that the digital data will be rectangular window and the blaking will be smooth since it will be replaced by zero as mentioned above**).

Regarding claim 14, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the carrier correction values are calculated for various carriers based on various pilot values (**i.e. please refer to frame structure, page 27, Fig. 11, shown the pilot and continual pilots between Kmin and Kmax values**).

Regarding claim 15, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the carrier correction values are calculated based on two closest pilots (**i.e. constellation points and Fig. 11 frame structure**).

Regarding claim 17, Maja with ETSI teaches claim 1,

Maja further teaches A method according to claim 16, wherein location of a blanking window is taken in account in deriving the covariance function (**i.e. to detect impulse noise and determine its position, amplitude, power, auto-correlation function (i.e. covariance function) or spectrum of the received signal, or the combination of the above, can be analysed, page 223, col 2, section 3**).

Regarding claim 19, Maja with ETSI teaches claim 1,

Maja further teaches wherein the certain carrier values comprises observed pilot carrier values of the received signal affected by the impulse interference (**i.e. the blanking is the value being replaced with 0 where the impulse noise is detected, so there will be impulse interference in some received pilot, page 224, section 4,**).

Regarding claim 20, Maja with ETSI teaches claim 1,

Maja further teaches wherein the prior known information comprises previously received pilot carrier values (**i.e. previous received symbols or pilots**).

Regarding claim 21, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the previously received pilot carrier values comprise transmitted pilot values multiplied with a channel estimate on pilot frequencies (**i.e. it is multiplied by the normalization factor as needed as described above**).

Regarding claim 22, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the previously received pilot carrier values are not affected by impulse interference (**i.e. it is inherent since the previous values are not interference then the next values will be received, because the it will be replaced by zero**).

Regarding claim 23, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the prior known information comprises interpolated pilot carrier values, wherein the interpolated pilot (**i.e. phase shift**) carrier values are obtained from a set of received OFDM symbols, wherein certain pilot carrier values affected by the impulse interference is interpolated based on pilot carrier values

received before and after the certain pilot carrier values (i.e. **various cells within the OFDM frame are modulated with reference information whose transmitted value is known to receiver. Cells containing reference information are transmitted at "boosted" power level. The information transmitted in these cells are scattered or continual pilot cells, so at the receiver side use of demapping and reference it computes the desired signal, page 26, section 4.5.1).**

Regarding claim 24, Maja with ETSI teaches claim 1,

ETSI further teaches method according to claim 23, wherein the pilot carrier values are multiplied with a channel estimate on respective pilot frequencies. (i.e. **it is multiplied by the normalization factor as needed as described above).**

Regarding claim 26, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the pilot carrier values are contained in at least one OFDM symbol of the received signal (i.e. **OFDM, it contains OFDM symbol, Annex).**

Regarding claim 27, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the multi-carrier signal comprises OFDM signal (i.e. **it is multicarrier OFDM).**

Regarding claim 28, Maja with ETSI teaches claim 1,

ETSI further teaches wherein the OFDM signal is operable in at least one of a DVB system, a terrestrial DVB system and a ISDB-T system (**i.e. it is DVB**).

Regarding claim 29, there are substantially same limitations as claim 1, thus the same rejection is applicable.

Regarding claim 30, there are substantially same limitations as claim 27, thus the same rejection is applicable.

Regarding claim 31, there are substantially same limitations as claim 28, thus the same rejection is applicable.

Regarding claim 32, Maja with ETSI teaches claim 29,

ETSI further teaches means for interaction with a service provider providing the signal (**i.e. it is inherent to have interaction to service provider since it interference with the received signal**).

Regarding claim 33, Maja with ETSI teaches claim 32,

ETSI further teaches means for interaction comprising cellular mobile operable under coverage of cellular mobile network (**i.e. it is inherent to implement in cellphone like described CDMA**).

Regarding claim 34, there are substantially same limitations as claim 2, thus the same rejection is applicable.

Regarding claim 35, there are substantially same limitations as claim 3, thus the same rejection is applicable.

Regarding claim 36, there are substantially same limitations as claim 27, thus the same rejection is applicable.

Regarding claim 37, there are substantially same limitations as claim 32, thus the same rejection is applicable.

Regarding claim 38, there are substantially same limitations as claim 1, thus the same rejection is applicable.

Regarding claim 39, there are substantially same limitations as claim 28, thus the same rejection is applicable.

Regarding claim 40, there are substantially same limitations as claim 1, thus the same rejection is applicable.

Regarding claim 41, there are substantially same limitations as claim 1, thus the same rejection is applicable.

Regarding claim 44, Maja with ETSI claim 1,

Maja further teaches wherein performing correction of the estimate without Inversion Fast Fourier Transform or feedback circuitry comprises using at least one of minimum mean square error estimation, autocorrelation estimation or suboptimal approximation in performing the correction (i.e. **to detect impulse noise and determine its position, amplitude, power, auto-correlation function or spectrum of the received signal, or the combination of the above, can be analyzed, page 223, col 2, section 3).**

Allowable Subject Matter

8. Claims 18, 25, 42 and 43 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANMAY K. SHAH whose telephone number is (571)270-3624. The examiner can normally be reached on Mon-Thu (7:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TANMAY K SHAH/
Examiner, Art Unit 2611

/David C. Payne/

Application/Control Number: 10/517,937

Page 19

Art Unit: 2611

Supervisory Patent Examiner, Art Unit 2611